SURVEYOR DISTRIBUTED DIGITAL FAULT RECORDER

Complete Transient Fault Recording and Analysis

Long Term Phasor Recording

Power Quality Monitoring

Continuous Recording
Complies with
NERC - PRC-002-1
NERC - PRC-018-1

Remote Input communication up to 1500 meters using multi-mode 62.5/125 fiber optic cable.
A single Controller and Local Interface connects 1-4 Remote Input Units. Each Remote Input Unit can be configured with 8 or 16 Analog Input Channels and 16 or 32 Event Input Channels.

The Surveyor Distributed Recording System employs the same Microsoft Windows 7® operating system as the E-MAX DII DFR. This system features complete Transient and Long-Term Phasor Data Recording, Analysis, and Transmission. The new E-MAX DFR has a maximum capacity of 64 Analog and 128 Digital remotely connected channels. The main hardware components, the Analog and Event Input Cards and the Interface Card, of the Distributed System are identical to those found in the DII DFR.

The networking capabilities of Windows 7® operating system provide the power and capacity to monitor and collect data from other substation equipment. The TCP/IP addressing and data handling also allow communications with a Master Station and other devices. Just like the E-MAX DII system, the Distributed Recording System includes complete remote control.
Conversion of Record Data

The Surveyor Distributed Recording System continuously monitors all channels. If triggered, the Surveyor will record data to memory and process according to user settings. This System automatically identifies fault type and calculates distance to fault. All E-MAX DFR systems can print, display, fax, transmit and e-mail recorded and calculated data automatically or upon operator request. Converting record data to COMTRADE and PQDIF formats may be done automatically or upon operator request.

Communication

Remote to Local Fiber Optic; 1500 meters using multi-mode 62.5/125 cable.
Local Interface to Controller; Proprietary parallel interface
Controller to Master Station; 10/100/1000 Mb Ethernet

DFR and Power Quality Sensors

Single Phase - One Per Channel
Under Limit Sensors - rms setting
  with Hysteresis 10 - 100 percent
  Rate of Change up to 5 %
Over Limit Sensors - rms setting
  with Hysteresis 95 - 300
  with Time Delay (selectable) 30 msecs
  Rate of Change up to 50% per cycle
  Frequency Over and Under 56 - 64 Hz
  Frequency Delta Trigger 0.5 - 4 Hz

Three Phase Triggers
  Positive Sequence 0 - 150%
  Negative Sequence 0 - 30%
  Zero Sequence 0 - 30 %
  Real Power Threshold and Step Change
  Reactive Power Threshold and Step Change
  Apparent Power Threshold and Step Change

Extended Triggers
  Frequency and Delta Frequency 56 - 64 Hz
  Power Triggers 3 Phase, Real, Reactive, Apparent
  Sequence Triggers 3 Phase, Positive, Negative and Zero
  Total Harmonic Distortion 5 - 50%

Swing Triggers
  specified by crest to valley percentage
  5 - 30 % setting and time swing of 0.5 to 4 cycles/second
Analog Inputs: 8 to 16 per Remote, up to 4 Remote Units.  
Analog Input Range: Voltage: 0 to 500 Vac rms or Current: 0 to 200 Amp.  
Accuracy: 1 %, calibrated to .5%  
Analog Isolation: 2500 Volts rms  

Sampling Rate: Standard Base Sample Rate — 5760 samples/channel/second with 2880, 1440, 720 Hz, samples/channel/second software programmable.  

Digital/Event Inputs: 16 to 32 inputs per Remote, up to 4 Remote Units.  
1. Input Configuration N.O. or N.C. (Software Selected)  
2. Input Voltage 125 Vdc Nominal standard —24, 48, 250 Vdc available  
3. Isolation 2500 VDC (To Ground) and between inputs  

Sensors: Auto-resetting standard  
1. Analog Sensors Over-, Under- limits and rate software sensors on each channels  
2. Operation Limiters Symmetrical component, harmonic, frequency swing sensors  
3. Event Sensors Individual Programmable (N.O., N.C., Trigger on ALARM and/or RETURN)  
4. External Sensors Contact or voltage input  

Continuous Recording Phasor recording - simultaneous with Transient recording.  
Sample rate is software selectable: 1 sample/cycle, 1/2 sample/cycle, 1/4 sample/cycle, 1/8 sample/cycle  
Programmable Record Length  
90 days maximum length  
Logs of signals, power, and frequency (optional)  

High Speed Transient Recording:  
Prefault Period: Up to 10 seconds. Default setting: 10 cycles.  
Postfault Period: Minimum Record Length can be set with System Parameter file (0.5 sec default).  
Maximum Postfault Time - Can be set for continuous data streaming to disk capacity. (Longest Postfault captured to date: 31 minutes)  

Record Storage: Nonvolatile data storage on local SATA drive. Optional solid state drive.  
Capacity determined by disk size and scan frequency.  
Resolution: 16 bit  

Controller: Atom N270 CPU. 2 Gb RAM standard  
2 USB 2.0 Ports, 1 Parallel Port, PCI Hard Disk Controller.  

Graphic Output: Supports color inkjet, laser or dot matrix printers  
Graphics display on optional monitor.  

Data Storage: SATA Hard Disk. Solid State Disk (optional)  
Clock Options: GPS Timing - GPS Receiver or IRIG B Decoder Internal (1 kHz or TTL), External GPS Clock, or Internal GPS  
Clock Decoder Accuracy: Better than 20 μs.  

Communications Capability: Data/Fax Modem and Network cards available.  
1. To Master Stations Automatic transmission of data files.  
Functions with multiple-Master system.  
Complete Remote Control  
2. To Fax Machines Up to 24 locations. (Up to 8 Fax numbers in each of three outputs.)  
3. LAN and WAN Software supports communication via TCP/IP  

Software Supplied:  
Complete remote control, test and data retrieval, display and screen manipulation.  
Remote setting of program and system parameters.  
Complete data analysis software for Recorder and Master Station included.  
2. Communications Remote Control Computing Program - Communication Software  
Network control and data transmission (Ethernet)  

Environmental Characteristics:  
Operating Temperature 0° To 60° Centigrade  
Storage -20° to 65° Centigrade  
Relative Humidity 0 to 95% R.H. non-condensing  
Surge Withstand Capability: ANSI C37.90.1 1989  

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